

# NASA TECH BRIEF

## *Marshall Space Flight Center*



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

### Very High Speed Direct-Readout, Control and Recording System

A system has been designed that will provide a very high speed readout, control, and recording capability. It is applicable to numerous situations involving any parameter wherein the dynamic value can be converted to usable frequency. Previous electronic and/or mechanical systems used for readout and control have displayed a limited accuracy under dynamic conditions because of low data conversion speed. Although the present electronic systems have been the best available, the manner in which they operate makes time a very important factor in their accuracy. In such systems, accuracy deteriorates if a continuous record of parameter variations is necessary.

During operation, a transducer output (an ac signal whose frequency is proportional to parametric value) is divided with an electronic digital counter by an appropriate number to establish a time period. During this time period, the output of the oscillator, which is used as a frequency standard, is gated into the digital counter. With the proper selection of the oscillator output frequency, the output of the counter becomes a direct readout of the parameter applied to the transducer. The gating arrangement used to shift the output of the digital counter feeds this output to the storage register which, in turn, passes the information to a high speed printer. The printer records the information upon command generated by a digital counter; this counter generates data shift, print, and reset commands.

Because the measuring system is capable of generating data at four to eight times the rate of the printer, only every fifth to eighth readout is recorded. The maximum recording speed is limited to an ultimate of 200 recordings per second. When the printer completes a printout, it

generates a signal which resets the storage register in preparation for the reception of the next readout to be printed. The primary advantage of the system is its ability to give a direct recording of parameter value several times (20 to 40) each second. The measurement can be made every four to six milliseconds and used for control functions, but the printed record is limited due to the limitations of the printer speed. The system is unique in its high speed capability at which the information is generated and recorded and in the method of translating the information to a direct printout value. The system also has an extremely fast reset time.

#### Note:

No additional information is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
Marshall Space Flight Center  
Code A&TS-TU  
Huntsville, Alabama 35812  
Reference: B72-10442

#### Patent status:

This is the invention of a NASA employee and a patent application has been filed. Inquiries concerning license rights may be made directly to the inventor:

Mr. John W. Turner  
Marshall Space Flight Center  
Huntsville, Alabama 35812

Source: J. W. Turner  
Marshall Space Flight Center  
(MFS-20658)